

C L A I M S

1. An image encoding method characterized by
2 comprising the steps of:
3 generating a transformation coefficient by
4 transforming an image from a spatial domain into a
5 frequency domain; and
6 quantizing the transformation coefficient by
7 using the same quantization width as that at the time of
8 decoding with a quantization characteristic different
9 from a quantization characteristic at the time of
10 decoding.

2. An image encoding method according to
2 claim 1, characterized in that the step of quantizing
3 comprises the step of quantizing the transformation
4 coefficient using a dead zone.

3. An image encoding method according to
2 claim 2, characterized by further comprising the step of
3 setting a dead zone width.

4. An image encoding method according to
2 claim 3, characterized in that the step of setting the
3 dead zone width comprises the step of setting the dead
4 zone width for said each transformation coefficient.

5. An image encoding method according to
2 claim 3, characterized in that the step of setting the
3 dead zone width comprises the step of, when a set of
4 blocks each including a plurality of transformation
5 coefficients as constituent elements are to be quantized

6 with the same quantization width, setting the dead zone
7 width for said each block.

6. An image encoding method according to
2 claim 3, characterized in that the step of setting the
3 dead zone width comprises the step of adaptively
4 changing the dead zone width.

7. An image encoding method according to
2 claim 4, characterized in that the step of setting the
3 dead zone width comprises the step of setting the dead
4 zone width to a smaller width for a transformation
5 coefficient with higher visual sensitivity in a
6 frequency domain, and setting the dead zone width to a
7 larger width for a transformation coefficient with lower
8 visual sensitivity in a frequency domain.

8. An image encoding method according to
2 claim 5, characterized in that the step of setting the
3 dead zone width comprises the step of setting the dead
4 zone width to a smaller width for a block with higher
5 visual sensitivity in a spatial domain, and setting the
6 dead zone width to a larger width for a block with lower
7 visual sensitivity in a spatial domain.

9. An image encoding method according to
2 claim 6, characterized in that the step of changing the
3 dead zone width comprises the step of adaptively
4 changing the dead zone width in accordance with a
5 flatness of the image.

10. An image encoding method according to

2 claim 9, characterized by further comprising the step of
3 calculating a flatness of the image from at least one of
4 a prediction mode of the image, a direction of
5 intra-frame prediction of the image, motion of the
6 image, a direction of inter-frame prediction of the
7 image, an average absolute error of the image, a
8 variance of the image, a difference between a maximum
9 value and minimum value of the image, an average
10 absolute error of a prediction error signal of the
11 image, and a variance of a prediction error signal of
12 the image.

11. An image encoding method according to
2 claim 3, characterized in that the step of setting the
3 dead zone width comprises the step of obtaining the dead
4 zone width from a relationship between an ideal
5 quantization width and a real quantization width.

12. An image encoding device characterized by
2 comprising:
3 transformation means for generating a
4 transformation coefficient by transforming an image from
5 a spatial domain into a frequency domain; and
6 quantization means for quantizing the
7 transformation coefficient by using the same
8 quantization width as that at the time of decoding with
9 a quantization characteristic different from a
10 quantization characteristic at the time of decoding.

13. An image encoding device according to

2 claim 12, characterized in that said quantization means
3 comprises means for quantizing using a dead zone.

14. An image encoding device according to
2 claim 13, characterized by further comprising dead zone
3 generating means for setting a dead zone width in said
4 quantization means.

15. An image encoding device according to
2 claim 14, characterized in that said dead zone
3 generating means comprises dead zone scale generating
4 means for setting the dead zone width for said each
5 transformation coefficient.

16. An image encoding device according to
2 claim 14, characterized in that said dead zone
3 generating means comprises dead zone scale generating
4 means for, when said quantization means quantizes a set
5 of blocks each including a plurality of transformation
6 coefficients as constituent elements with the same
7 quantization width, setting the dead zone width for said
8 each block.

17. An image encoding device according to
2 claim 14, characterized in that said dead zone
3 generating means comprises dead zone scale generating
4 means for adaptively changing the dead zone width.

18. An image encoding device according to
2 claim 15, characterized in that said dead zone scale
3 generating means comprises means for setting the dead
4 zone width to a smaller width for a transformation

5 coefficient with higher visual sensitivity in a
6 frequency domain, and setting the dead zone width to a
7 larger width for a transformation coefficient with lower
8 visual sensitivity in a frequency domain.

19. An image encoding device according to claim
2 16, characterized in that said dead zone scale
3 generating means comprises means for setting the dead
4 zone width to a smaller width for a block with higher
5 visual sensitivity in a spatial domain, and setting the
6 dead zone width to a larger width for a block with lower
7 visual sensitivity in a spatial domain.

20. An image encoding device according to
2 claim 17, characterized in that said dead zone scale
3 generating means comprises means for adaptively changing
4 the dead zone width in accordance with a flatness of the
5 image.

21. An image encoding device according to
2 claim 20, characterized by further comprising means for
3 calculating a flatness of the image from at least one of
4 a prediction mode of the image, a direction of
5 intra-frame prediction of the image, motion of the
6 image, a direction of inter-frame prediction of the
7 image, an average absolute error of the image, a
8 variance of the image, a difference between a maximum
9 value and minimum value of the image, an average
10 absolute error of a prediction error signal of the
11 image, and a variance of a prediction error signal of

12 the image.

22. An image encoding device according to
2 claim 14, characterized in that said dead zone
3 generating means comprises dead zone scale generating
4 means for obtaining the dead zone width from a
5 relationship between an ideal quantization width and a
6 real quantization width.

23. An image encoding control program
2 characterized by causing a computer to function as
3 transformation means for generating a
4 transformation coefficient by transforming an image from
5 a spatial domain into a frequency domain, and
6 quantization means for quantizing the
7 transformation coefficient by using the same
8 quantization width as that at the time of decoding with
9 a quantization characteristic different from a
10 quantization characteristic at the time of decoding.

24. An image encoding control program
2 according to claim 23, characterized in that the
3 quantization means comprises means for quantizing using
4 a dead zone.

25. An image encoding control program
2 according to claim 24, characterized in that the
3 computer is caused to function as dead zone generating
4 means for setting a dead zone width in the quantization
5 means.

26. An image encoding control program

2 according to claim 25, characterized in that the dead
3 zone generating means comprises dead zone scale
4 generating means for setting the dead zone width for
5 said each transformation coefficient.

27. An image encoding control program
2 according to claim 25, characterized in that the dead
3 zone generating means comprises dead zone scale
4 generating means for, when the quantization means
5 quantizes a set of blocks each including a plurality of
6 transformation coefficients as constituent elements with
7 the same quantization width, setting the dead zone width
8 for said each block.

28. An image encoding control program
2 according to claim 25, characterized in that the dead
3 zone generating means comprises dead zone scale
4 generating means for adaptively changing the dead zone
5 width.

29. An image encoding control program
2 according to claim 26, characterized in that the dead
3 zone scale generating means comprises means for setting
4 the dead zone width to a smaller width for a
5 transformation coefficient with higher visual
6 sensitivity in a frequency domain, and setting the dead
7 zone width to a larger width for a transformation
8 coefficient with lower visual sensitivity in a frequency
9 domain.

30. An image encoding control program according

2 to claim 27, characterized in that the dead zone scale
3 generating means comprises means for setting the dead
4 zone width to a smaller width for a block with higher
5 visual sensitivity in a spatial domain, and setting the
6 dead zone width to a larger width for a block with lower
7 visual sensitivity in a spatial domain.

31. An image encoding control program
2 according to claim 28, characterized in that the dead
3 zone scale generating means comprises means for
4 adaptively changing the dead zone width in accordance
5 with a flatness of the image.

32. An image encoding control program
2 according to claim 31, characterized in that the
3 computer is caused to function as means for calculating
4 a flatness of the image from at least one of a
5 prediction mode of the image, a direction of intra-frame
6 prediction of the image, motion of the image, a
7 direction of inter-frame prediction of the image, an
8 average absolute error of the image, a variance of the
9 image, a difference between a maximum value and minimum
10 value of the image, an average absolute error of a
11 prediction error signal of the image, and a variance of
12 a prediction error signal of the image.

33. An image encoding control program
2 according to claim 25, characterized in that the dead
3 zone generating means comprises dead zone scale
4 generating means for obtaining the dead zone width from

5 a relationship between an ideal quantization width and a
6 real quantization width.